

## CLAIMS

What is claimed is:

1. An electronic engine for generating acoustic musical notes, comprising:

5 a memory containing data;

an electronic controller connected to said memory and producing a control signal in accordance with said data;

at least one tone generating member, said tone generating member generating a corresponding musical note upon imparting motion to respective ones of  
10 the tone generating members; and

an actuator in communication with said controller for generating, in response to said control signal, a temporary magnetic field, said actuator positioned sufficiently close to said at least one tone generating member to attract or repel said tone generating member without causing physical contact between said at least one  
15 tone generating member and said actuator at the commencement of the attraction or repulsion, whereby a vibrating motion is caused in said at least one tone generating member to produce said corresponding musical note.

2. The electronic engine of claim 1, wherein said tone generating member comprises a plurality of tone generating members formed as a comb of  
20 adjacently-separated tines, with each said tine capable of generating a corresponding musical note.

3. The electronic engine of claim 2, wherein the individual musical notes comprise a diatonic scale of musical notes.

4. The electronic engine of claim 2, wherein said actuator comprises a plurality of actuators, with each actuator corresponding to at least one of said tines.

5 5. The electronic engine of claim 4, wherein said data comprises information for energizing specific ones of said actuators in said plurality of actuators for producing musical notes from said tines according to a sequence defined by said information, thereby causing a melody to be played from said individual musical notes.

10 6. The electronic engine of claim 5, wherein said data comprises a plurality of melodies.

7. The electronic engine of claim 4, wherein each said tine has a resonant frequency, said data comprising address signals for activating specific ones of said actuators in said plurality of actuators according to a series of activation pulses having a frequency proximate the resonant frequency of said corresponding tine.

15 8. The electronic engine of claim 7, wherein said activation pulses for each actuator have a duty cycle not more than fifty percent of the resonant frequency of each corresponding tine.

9. The electronic engine of claim 4, wherein each tine has a free end and wherein said plurality of actuators are positioned at said free ends.

20 10. The electronic engine of claim 4, wherein each tine has a free end and wherein said actuators are positioned in a staggered arrangement relative to said free ends.

11. The electronic engine of claim 4, wherein each tine has a top surface and a bottom surface and wherein some of said actuators are positioned opposing said top surfaces and others of said actuators are positioned opposing said bottom surfaces.

12. The electronic engine of claim 4, further comprising a plurality of  
5 lights, with each light corresponding to one of said actuators, said lights being selectively operable in response to said control signal.

13. The electronic engine of claim 4, wherein said electronic controller is used to control one or more of a motor, light and solenoid.

14. The electronic engine of claim 4, further comprising a base plate  
10 mounted to said comb.

15. The electronic engine of claim 14, further comprising a housing mounted to said base plate.

16. An electronic music engine for producing acoustic musical notes, comprising:

15 a comb having a plurality of tines containing ferrous material and tuned to a plurality of notes, each tine producing a select note upon imparting movement to one of said tines corresponding to said select note;

a plurality of actuators operating between a magnetized state and an unmagnetized state, said actuators positioned at a location relative to said comb for  
20 generating one of an attraction force and a repulsion force directed at said tines when said actuators are in said magnetized state, without requiring physical contact between said actuators and said tines; and

an electronic controller connected to said plurality of actuators, said electronic controller generating a control signal for energizing specific ones of said actuators according to a predetermined sequence to cause said energized specific actuators to impart movement to tines influenced by said magnetized state of said energized specific actuators, whereby said musical notes associated with said moving tines are produced.

17. The electronic engine of claim 16, wherein movement is imparted to said tines by said attraction force.

18. The electronic engine of claim 17, wherein each tine has a resonant frequency and wherein said control signal energizes said specific ones of said actuators by resonantly adding energy thereto.

19. The electronic engine of claim 17, wherein said control signal comprises data corresponding to a plurality of melodies.

20. The electronic engine of claim 18, wherein the activation pulses in said series of activation pulses have a duty cycle of not more than fifty percent of the resonant frequency of said influenced tine.

21. The electronic engine of claim 17, wherein each tine has a free end and wherein said plurality of actuators are positioned at said free ends.

22. The electronic engine of claim 17, wherein each tine has a free end and wherein said actuators are positioned in a staggered arrangement relative to said free ends.

23. The electronic engine of claim 17, wherein each tine has a top surface and a bottom surface and wherein some of said actuators are positioned opposing said top surfaces and others of said actuators are positioned opposing said bottom surfaces.

5           24. The electronic engine of claim 17, further comprising a plurality of lights, with each light corresponding to one of said actuators, said lights being selectively operable in response to said control signal.

25. The electronic engine of claim 17, further comprising a motor responsive to said electronic controller for imparting motion to a decorative member.

10           26. The electronic engine of claim 17, further comprising a base plate mounted to said comb.

27. The electronic engine of claim 17, further comprising a housing mounted to said base plate.

28. An electronic engine for generating acoustic musical notes,  
15 comprising:

a memory containing data;

an electronic controller connected to said memory and producing a control signal in accordance with said data;

at least one tone generating member generating a corresponding musical  
20 note upon imparting motion thereto; and

actuating means for generating, in response to said control signal, a magnetic field, said actuating means causing one of an attraction force and a repulsion

force from said temporary magnetic field to be directed at said tone generating member to respectively attract or repel said tone generating members without requiring physical contact between said tone generating member and said actuating means, whereby a vibrating motion is caused in said tone generating member to produce said  
5 corresponding musical note.

29. The electronic engine of claim 28, wherein said tone generating member comprises a plurality of tone generating members, each capable of generating a corresponding tone.

30. The electronic engine of claim 29, wherein said actuating means  
10 comprises a plurality of actuating coils.

31. The electronic engine of claim 29, further comprising a plurality of illumination sources and an illumination control means for selectively energizing the illumination sources.

32. The electronic engine of claim 31, wherein said illumination control  
15 means is operable from said control signal.

33. The electronic engine of claim 32, wherein said control signal synchronizes said illumination control means to said actuator means.

34. The electronic engine of claim 33, wherein said plurality of tone generating members comprise a comb of adjacently-separated tines, with each tine  
20 capable of generating a corresponding musical note.

35. The electronic engine of claim 28, wherein said actuating means comprises a plurality of actuating coils.

36. The electronic engine of claim 34, wherein each tone generating member has an associated resonant frequency and wherein said control signal energizes said specific ones of said actuating coils by resonantly adding energy thereto.

37. A method of generating acoustic musical notes, comprising the  
5 steps of:

producing a control signal representative of a musical melody;

providing a plurality of tone generating members, each said member generating a corresponding musical note upon imparting motion to said one tone generating member;

10 placing an actuator at a distance from said plurality of tone generating members; and

generating in said actuator, and in response to said control signal, a temporary magnetic field of sufficient strength to attract or repel at least one of said tone generating members according to a predetermined sequence as dictated by said control  
15 signal, without requiring physical contact between said at least one tone generating member and said actuator, whereby a vibrating motion is caused in said tone generating members to produce said corresponding musical note.

38. The method of claim 37, wherein said generating step further comprises generating the temporary magnetic field of sufficient strength to attract said at  
20 least one tone generating member.

39. The method of claim 38, wherein each tone generating member in said plurality of tone generating members comprises a tine on a comb, with each time

having an associated resonant frequency, and wherein said generating step further comprises generating the temporary magnetic field by applying a series of activation pulses to said actuator at a frequency proximate the resonant frequency of at least one of said tines.

- 5                    40.    The method of claim 39, wherein the activation pulses in said series of activation pulses have a duty cycle of not more than fifty percent of the resonant frequency of said at least one tine.